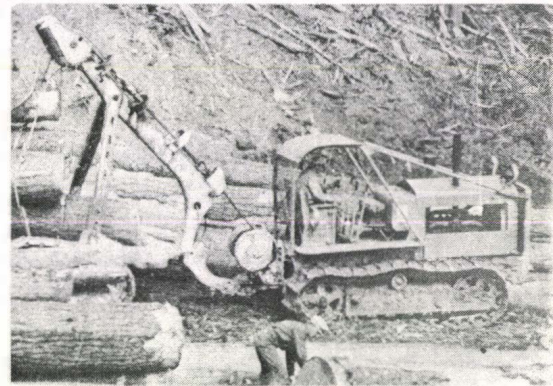


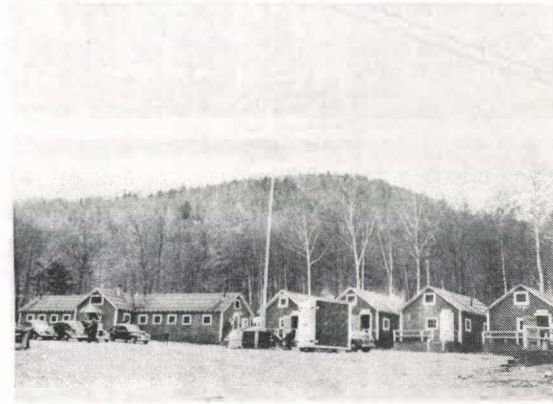
# NORTHEASTERN LOGGERS' HANDBOOK

by

**Fred C. Simmons**  
PRELIMINARY REVIEW EDITION



*Easier and Safer Work*



*Greater Production (more pay) and Better Living Conditions*

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## **SECTION 3: — HOW TO SELECT AND TAKE CARE OF YOUR BOW SAW**

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NORTHEASTERN FOREST  
EXPERIMENT STATION



United States Department of Agriculture

FOREST SERVICE  
NORTHEASTERN FOREST EXPERIMENT STATION

614 Bankers Securities Building  
Philadelphia 7, Pennsylvania

V. L. HARPER, DIRECTOR

FOREST UTILIZATION SERVICE  
James C. Rettie, Chief

If you want to be a mechanic, you will easily find plenty of good books which will tell you what you need to know. You will also find plenty of instructors and training shops.

What about the young man who wants to make his living by logging? For him there is no good source of information to which he can turn. The books and courses on logging are for the logging engineers--not for the fellow who uses the axe and crosscut.

Why shouldn't there be a simple illustrated handbook which will tell the young woodsman (or the green woodsman) what he needs to know about the care and use of his tools and the best of the old and the new techniques of, and devices for logging? He needs to know the "tricks of the trade" as much as anyone.

We hope that these pages, together with other short papers like it, will finally be put together in a printed NORTHEASTERN LOGGERS' HANDBOOK. We are putting it out in this form first because there seems to be an urgent need for this sort of information; and because we need the help and advice of persons who know about logging in our region before printing. We want the experienced logger to tell us what important things we have missed and where our advice is not good. We want the young man going into the woods for the first time to tell us what parts of it he finds hard to understand, to suggest how it can be made more useful to him. We would like the equipment manufacturers to check our recommendations for use of their products and tell us about new devices they are developing.

Please send criticisms, questions and suggestions to: The Director, Northeastern Forest Experiment Station, 614 Bankers Securities Building, Philadelphia 7, Penna. Additional copies of this and other publications in this series can be obtained from the same address.

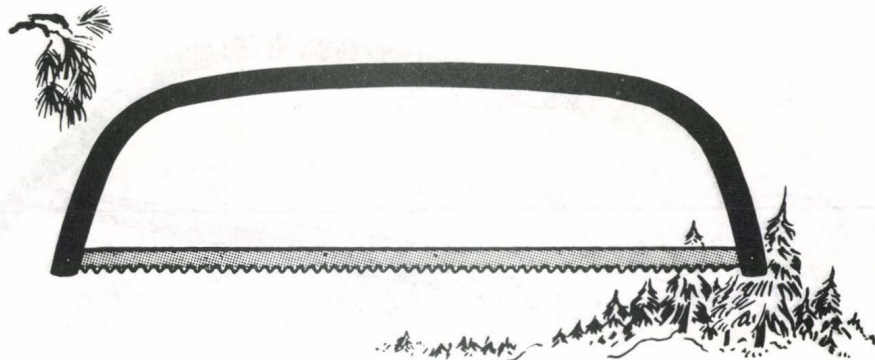
## HOW TO TAKE CARE OF YOUR BOW SAW

The bow saw, now widely used by pulp wood cutters in the Northeast and in Canada, was developed in Sweden. It really is an improved model of the old-type buck saw with a better blade and a frame which holds the blade under greater tension. Here we have an excellent crosscut saw for one-man use on timber which is less than 12 inches in diameter. For wood which is more than 12 inches in diameter, the standard crosscut is a better tool. The bow saw has not been used to any great extent in the sawing of hardwoods. For this kind of work a two-man crosscut is generally considered easier to use, although production per man day could almost certainly be increased by adoption of the bow saw.

### SAW FRAMES

There are three types of bow saw frames. All are made of light tubular steel which should provide a tension on the blade of from 250 to 350 pounds. Frames made of pear shaped tubing are easier to handle than those made round or oval.

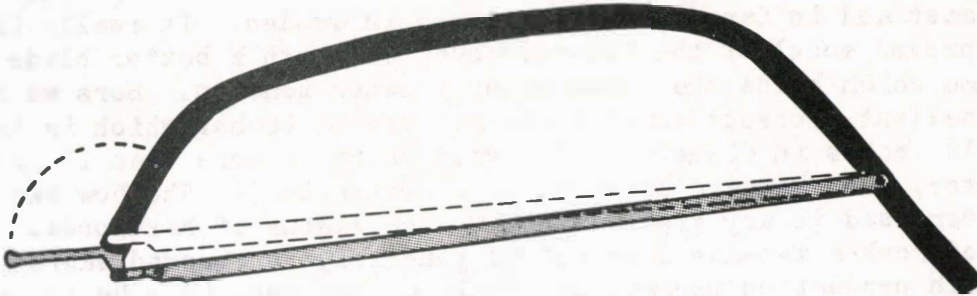
The simplest and cheapest model has a one-piece frame with the blade riveted into each end.



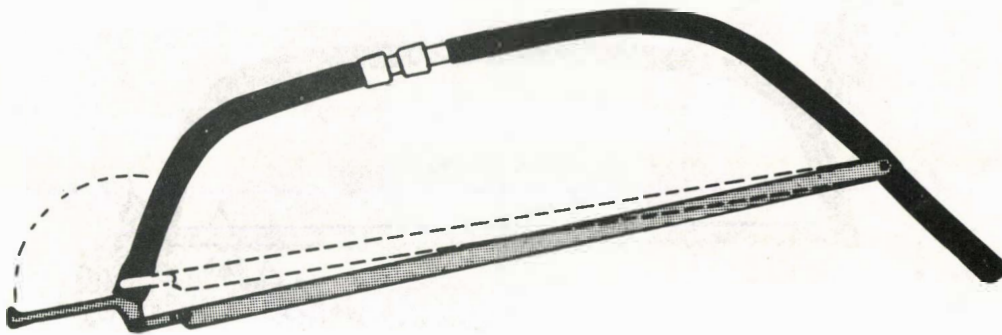
This one is very light and sturdy and gives good service when it is new. There is, however, no easy way to relieve the tension on the blade during long periods when the saw is not in use. In time the bow will lose more and more of its tension until the saw blade becomes too loose. The only remedy for this condition is to cut off one end of the blade and to make a new hole. This shortening of the blade may be successful and it may not--all depends on the tension which may be too much or too little. In most cases it will be advisable to buy a new saw rather than to try shortening the blade on the old one.



Part of the difficulty which has just been mentioned is overcome in the frame which has a spring-tension lever on one end of the frame.

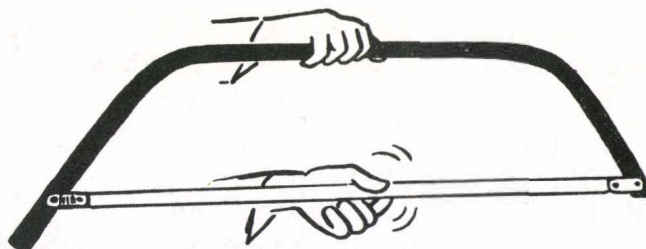


This makes it possible to relieve the tension on the blade quite easily and also to remove the blade from the frame when it needs to be sharpened. It is recommended that the tension be slacked off whenever the saw is not going to be in use for a few days. Even this frame, however, will in time lose its necessary tension. There is available an adjustable frame which can be lengthened in the middle thereby restoring tension which has been lost in the bends of the frame.



This adjustable frame is somewhat heavier than the simpler types. It also can get out of adjustment, particularly when the collar strikes a wedge which has been driven into the cut behind the saw. On the other hand, when given proper care, it will last indefinitely. In experienced hands it can always be at the proper tension.

The common method used in testing tension is to grasp the blade near the middle with a thumb and forefinger and twist it.



After having learned the "feel" of a properly tensioned blade, it is possible to judge the necessary tension. This ability will come to the woodsman after some experience. If the tension is too low, the blade tends to buckle in the cut. When this happens the saw pulls harder and the blade may be bent or broken. A saw in too much tension will "ping" with a high note when it is plucked. In such a condition it is likely to spring the frame. It may also snap in two when, for some reason, the saw binds in the cut and the blade is bent sideways.

### SAW BLADES

There are four major types of bow saw blades. The most popular is the four-cutters-to-one-raker pattern which is made with swage-ground and the straight-ground raker teeth.

#### SWAGE-GROUND RAKER



#### STRAIGHT-GROUND RAKER



There is considerable variation in the amount of flare given to the swage-ground raker. A moderate flare is usually preferred. The wide-flared raker is very fast cutting but hard to pull. It is used in Newfoundland for ordinary sawing but elsewhere only in sawing contests. The straight raker is easiest to pull but it cuts slower.

The other two tooth patterns are the two-cutters-to-one-raker and the skip-tooth types.

#### TWO CUTTERS TO ONE RAKER



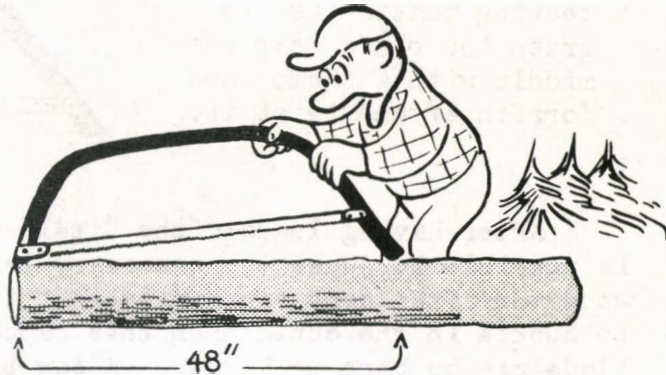
#### SKIP TOOTH



The two-cutters-to-one-raker pattern is probably best for hardwoods. The skip tooth saw is suitable for farmers who do only a small amount of cutting and who do not have much skill at fitting saws.

Bow saw blades are manufactured in 32, 36, 42 and 48-inch lengths. In cutting 48-inch pulpwood, the 42-inch blade is preferred because its frame with the projecting handle provides a convenient measure for bolt length.

Blades are made in 1-inch and in 1-3/8 inch widths. The best are "taper ground" which means that the blade is slightly thicker on the cutting edge than it is on the back edge. This tends to make it run more freely in the cut and requires less set in the teeth.

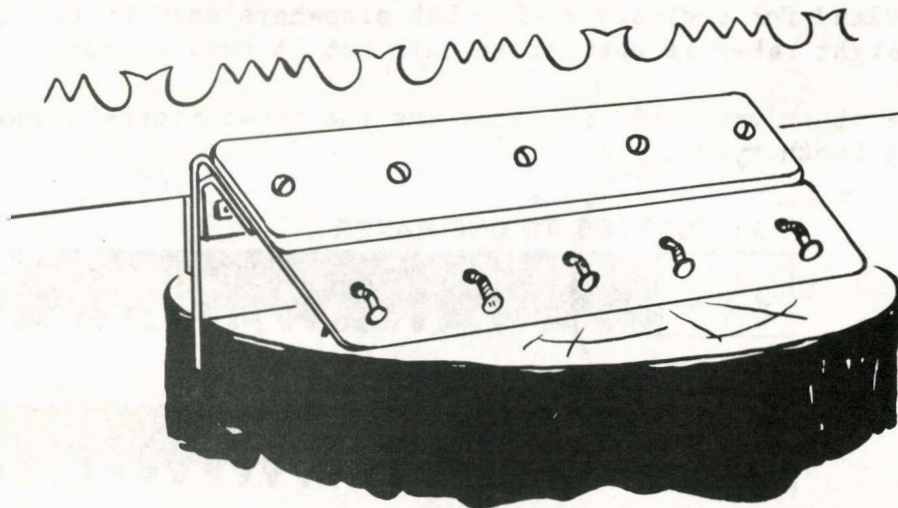


The narrow blade is somewhat easier to pull but is more easily broken. Inexperienced cutters will do well to choose the wider blade until they learn how to use the saw.

#### HOW TO SHARPEN THE BOW SAW BLADE

Far too many of the bow saws now in use are in bad condition because of poor sharpening. This seriously cuts down production and makes the work much harder than it needs to be. In some logging camps the job of keeping the saw blades in good cutting order has been assigned to an expert filer. This arrangement is usually far better than the one in which every man is expected to file his own saw.

To file a bow saw blade properly requires special tools that are made for that purpose, plus a considerable skill and experience. The elementary instructions offered here are only what must be known before one can begin to learn how to file this type of saw.

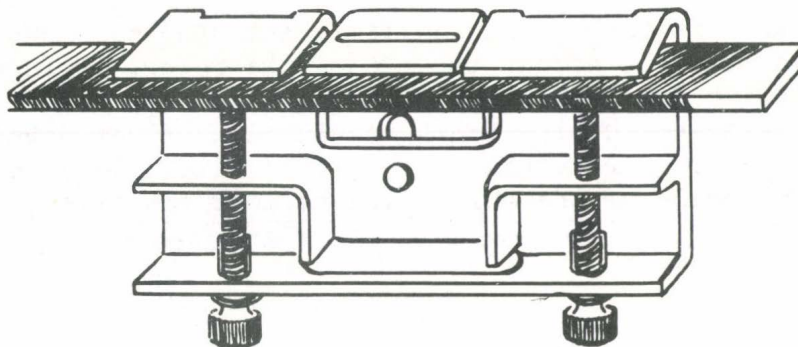




The first requirement for the job is some kind of saw-holding device. If the filing is done at camp, this can be made in accordance with the design recommended for a crosscut saw clamp. <sup>1/</sup> If part of the filing is to be done in the woods, it is better to obtain one of the metal holding devices which have been made by several of the saw manufacturers. One of these is shown in the sketch below. It consists of a metal plate about one-eighth inch in thickness folded in the middle so that one-half forms a 45° angle with the other half. On each side of the fold there is a spring metal strip fastened on with screw bolts. The saw blade is slipped under one of these strips. One edge of the base of the device is wedged into a vertical saw slit which has been cut down into the top of a convenient stump. The other edge can be fastened with two or three clinched-over nails. This gives a good solid base for the clamp. For most filing operations the saw is clamped in the straight-up position. In filing the cutter teeth it is best to move it into the slanting position. The blade will then be inclined away from the filer at an angle of 45°. The saw should be about level with the filer's elbows. The ground around the base of the stump should be level so that he can stand comfortably. The sun or artificial light should be at his back. The sequence of filing operations is described below.

#### JOINTING

A combination jointing tool and raker gauge is shown in the sketch below. This one is more elaborate than some and simpler than others.



To joint the cutting teeth a worn mill file is screwed tightly against the upper flange by means of the two thumb screws. The lower surface of the file is then placed on the teeth and drawn the full length of the saw. This is done until the file has touched every tooth except broken ones. The cutting teeth have then been "jointed".

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<sup>1/</sup> See page 6 of Section 2 of this Handbook

The next step is to joint the raker teeth. This is done by first removing the file and then adjusting the raker tooth gauge. The middle section of the tool is an elbow-shaped piece of metal which can be made to slide up and down in a verticle slot through which there is a set screw. On top there is another slot which will just fit over the points of a raker tooth. For ordinary softwood cutting, the adjustment is made so that the top of the middle section is about one-fiftieth of an inch lower than the under side of the two end sections. For cutting frozen wood or hardwoods, it should be about one-eightieth of an inch lower. A new dime can be used as a gauge. It is about one-fiftieth of an inch thick. A well worn dime should be about one-eightieth of an inch thick. When the tool has been properly adjusted, it is placed on each raker tooth. The points of the raker protrude through the slot on top. With the wide side of the raker file flat on this hardened metal plate, each raker tooth point is filed off until it is flush with the surface of the tool. When all the rakers have thus been brought to a uniform height--slightly shorter than the cutters, the second step in the sharpening operation has been completed.



RAKER FILE



GULLETING FILE

#### FILING RAKER

The third step is the filing of the raker teeth. Use the "V" side of a raker or "cantsaw" file. This is a special file made for this purpose. Be sure that it has a firmly set handle. Move the file at a right angle straight across the top of the raker. Bring the teeth to a sharp point and no more; leaving a square cutting edge. The gullets between rakers and cutting teeth should also be cut down a bit. This is best done with a rat-tail or gulleting file. Be careful to preserve the original shape of the gullet and to move the file straight across.

#### SETTING

The fourth step is to set the cutter teeth. This is done with a special saw set pliers like those illustrated in the sketch here. On the lower jaw of this tool there is an anvil which has a number of beveled faces. The upper jaw has a plunger which is squeezed down against the saw tooth to force it against a beveled face of the anvil. This gives the tooth its proper bend or "set". Bend each tooth away from the beveled side and be sure that the bend is in the whole tooth---not just in the point alone. Take pains to get a uniform set, otherwise the teeth will not track properly in the cut. If a tooth has too much set, it will score the sides of the kerf and make the saw that





much harder to pull. If it does not have enough set, it will be re-cutting the shaving and thus again causing a waste of energy. The experienced saw filer knows the setting job cannot be done too accurately. For summer cutting of softwood, and especially for those species which contain considerable pitch, the most set is required. In general, the width of the kerf, under these conditions should be about twice the thickness of the saw at its cutting edge or about the thickness of a new nickle for a 1-3/8" blade or a penny for a 1" blade. For frozen wood and for hardwoods, the amount of set should be considerably less--about the thickness of a well worn nickle or penny.



VIEWS OF PROPERLY  
SET TEETH



USE 5¢  
PIECE  
TO  
TEST  
SET

EDGE

#### FILING CUTTERS

The next operation is the filing of the cutter teeth. This is done with the saw slanting away from the filer or at a 45° angle. For this use a double "feather edge" file like that illustrated in the sketch below.



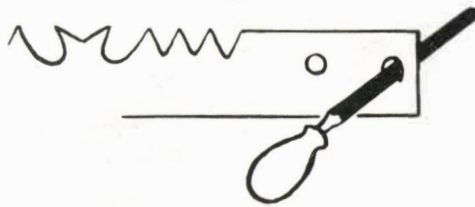
This has a diamond shape which permits the file to cut to the bottom of the "V" between the cutters. Considerable care should be given to bring each tooth to a sharp point and no more. Keep the original bevel and general shape of teeth.

### HONING

Finally, it is well to hone off any burrs that have formed on the outside of the cutters with a single pass of a fine whetstone. If, when the saw is tried out, it seems to want to lead toward one side, a further honing on that side may correct the difficulty. If two strokes of the stone do not stop leading, the blade will have to be jointed, set and filed again.

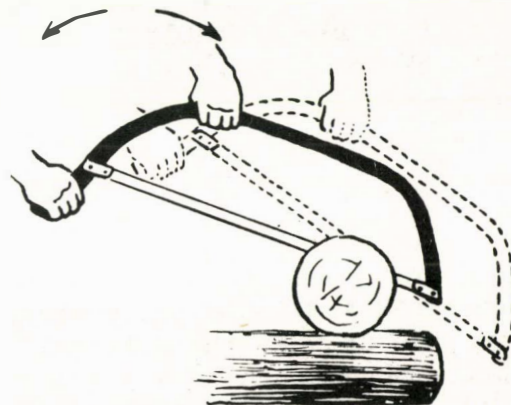
Simpler filing tools for the bow saw are available but these are not recommended for use by the inexperienced filer. Even the best filers can seldom turn out a good cutting saw with them.

After several filings the holes in the end of the bow saw blade should be filed or punched out toward the back, so that the pins holding the saw in the frame will remain at about the center of the blade.



### USE OF THE BOW SAW

The bow saw is essentially a one-man tool. Its use in bucking is relatively easy for even the inexperienced man. Once he gets the proper grip, illustrated here, he soon learns to cut rapidly. Another important thing is to learn to rock the saw, so that it does not chatter in the cut, especially on the return stroke. On the forward stroke, the held end of the saw is gradually raised so that its free end tips down 2 or 3 inches. On the return the held end is lowered. Sawing thus, continually on a corner, enables the saw to clear itself of dust more readily and less pressure on the saw is needed. The best sawyers saw with long even strokes, at least three-quarters of the length of the blade, at a rate of about 60 to 75 strokes a minute. The bow frame is kept directly above the blade at all times.

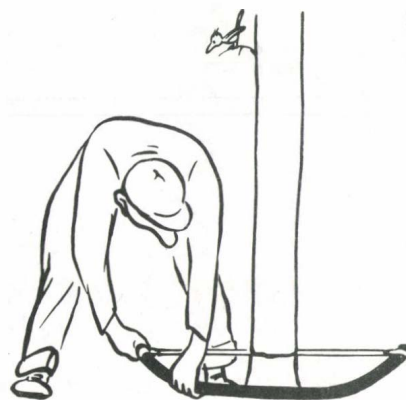


In certain situations, of course, the freedom of movement of the sawyer is restricted by other trees, rocks or the like, and he may be forced to saw with the short, jerky strokes typical of the inefficient sawyer.



**EXPERT BOW SAWYER DEMONSTRATING  
PROPER TECHNIQUE**

Felling with the bow saw is somewhat more difficult to learn. In this the sawyer uses the same grip, leans over until he is almost standing on his head, and saws with the same long even cornering stroke, taking care that the frame is exactly on a level with the blade at all times. Failure to keep the saw level means a crooked cut, hard sawing, and, not infrequently, a broken blade.



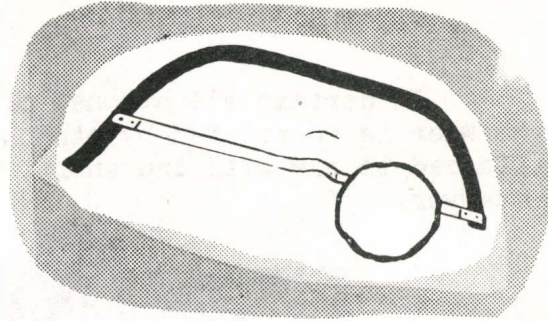
**FELLING WITH BOW SAW**

#### **BOW SAW POINTERS**

When sawing pitchy woods, such as yellow pine, liberal and frequent applications of kerosene to the saw blade are advisable.

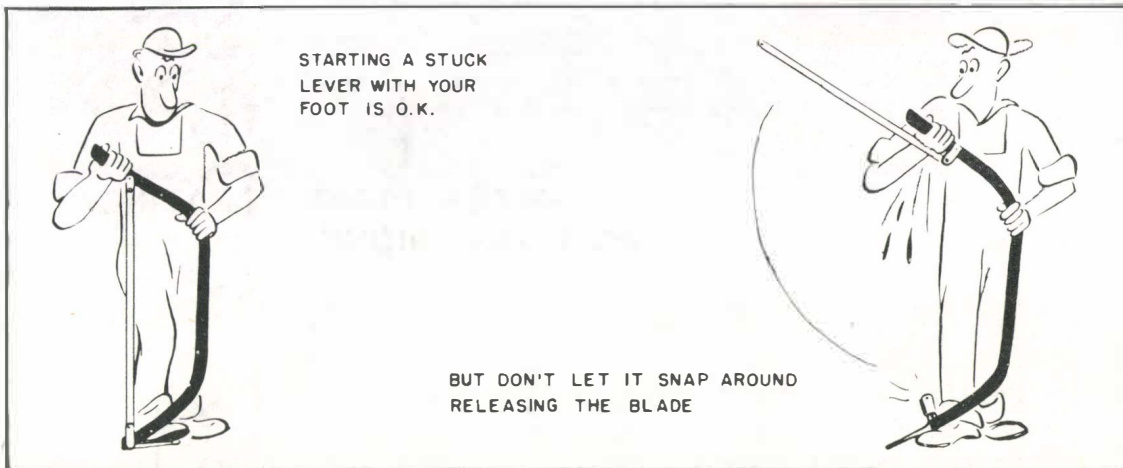


Maintain proper tension. A blade that is too loose will buckle, and often break in the cut. Even if it does not break, sawing with it is unnecessarily hard work. A blade that is too tight will spring the frame or break prematurely.



Keep an extra sharp blade handy at all times in case the one being used breaks, becomes dull, or has the set pinched out of it.

Release the tension on lever-arm saws easily. If it is too hard to do with your fingers, you can often start the lever with the side of your foot. Once it is started, however, hold it from snapping around. If it does, the blade may snap loose and give you a nasty cut.



Carry the saw over your shoulder with the blade toward the rear. Steady the frame with your hand.



PROPER CARRY FOR BOW SAW

SOME MANUFACTURERS OF  
BOW SAWS USED IN THE NORTHEAST

E. C. Atkins and Co.  
Indianapolis, Indiana

Henry Disston & Sons  
Philadelphia 35, Pa.

D. D. Terrill Saw Co.  
124-126 Exchange Street  
Bangor, Maine

Champion Saws Mfg. Reg'd.  
100 Charest Blvd.  
Quebec, P. Q. Canada

Sandvik Saw & Tool Corporation  
47 Warren Street  
New York 7, N. Y.

G. McKenney & Son  
216 Hammond Street  
Bangor, Maine

Simonds Saw & Steel Co.  
Fitchburg, Mass.

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Sections in this series previously issued:

Section 1: How to Choose, Use, and Sharpen Your Axe

Section 2: How to Choose, Use and Sharpen Your Crosscut Saw